Claims

What is claimed is:

1. A method for determining a property of a portion of a structure having a first layer and at least one underlying layer in contact with the first layer, the method comprising:

generating a first beam of electromagnetic radiation;

focusing the first beam on a region of the first layer;

measuring a signal corresponding to a temperature change in the first layer;

using a relationship between said measured temperature change and an electrical conductive property of said first layer; and

to determine said electrical conductive property of said first layer.

2. The method of Claim 1 wherein:

the predetermined frequency is smaller than a maximum frequency, said maximum frequency being inversely related to a radius, at the region, of the second beam.

3. The method of Claim 2 wherein:

said maximum frequency is approximately 100 kHz.

4. The method of Claim 2 further comprising:

changing a process parameter used in fabricating said structure in response to at least a predetermined change in said second power in multiple regions across said structure.

5. The method of Claim 2 wherein the predetermined frequency is less than:

$$\frac{k}{2\pi\rho c\lambda^2}$$ (Claims 1)

wherein:

k is thermal conductivity of the region;

ρ is the density of the region;

c is the specific heat; and

λ is wavelength of a wave solution to a diffusion equation for heat transfer from the region.

6. The method of Claim 2 further comprising:

comparing the power obtained from said measuring with a predetermined limit.

7. The method of Claim 1 wherein:

said measuring includes using a lock-in amplifier tuned to said predetermined frequency.

8. The method of Claim 7 wherein:

said measuring also includes using a narrow band filter tuned to the wavelength of said second beam to filter out at least another portion of said first beam reflected by said region.

9. The method of Claim 1 wherein said region is hereinafter referred to as "first region", the method further comprising:

focusing the first beam on a second region different from said first region; and

repeating said measuring in said second region.

10. The method of Claim 9 further comprising:

changing a process parameter used in fabricating said structure if the power measured in said region is nonuniform relative to the power measured in said second region.

11. The method of Claim 1 wherein:

the second power is sufficiently low to ensure that less than 10% of heat generated in said region is due to the second beam.

12. The method of Claim 1 wherein:

wherein the predetermined frequency is sufficiently low to ensure that an instantaneous temperature in said region is approximately equal to another temperature obtained in said region by heating with an unmodulated beam having a power equal to an instantaneous value of said first power.

13. The method of Claim 1 wherein:

the first layer is optically absorbing.

14. The method of Claim 1 wherein:

the first layer is at least partially absorbing.

15. The method of Claim 1 wherein:

the first layer includes a silicide.

16. The method of Claim 1 wherein:

the first layer is polysicilon.

17. The method of Claim 1 wherein:

the first layer is polysilicon with a silicided top surface.

18. The method of Claim 1 wherein:

the first layer is one of polysilicon and polycide, and said at least one underlying layer is an insulator layer located between said first layer and an underlying substrate.

19. An apparatus for evaluating a structure, said apparatus comprising:

a first source of a first beam of photons having a first power modulated at a frequency sufficiently low to ensure transfer of a majority of heat from a region of said structure illuminated by said first beam by diffusion;

a second source of a second beam of photons having a second power sufficiently low to ensure that an instantaneous temperature in said region is approximately equal to another temperature obtained in said region by heating with an unmodulated beam having power of an instantaneous value of said first power; and

a photosensitive element located in a path of a portion of said second beam after reflection from said region, said portion being modulated at said frequency of modulation of said first beam.

20. The apparatus of Claim 19 further comprising:

a computer coupled to said photosensitive element and programmed to determine if power of said portion of said second beam reflected by said region is at least greater than a predetermined power.

21. A method for evaluating a wafer, the method comprising:

focusing a beam on a partially transmissive conductive layer;

measuring reflectance of said beam from said layer; and

correlating said reflectance from said layer to a previously determined value, said previously determined value having been obtained from a previous reflectance measurement on a reference wafer.

22. The method of Claim 21 further comprising:

performing a plurality of measurements of reflectance along a line, to identify variation in a property of said layer along said line.